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A VISUALIZATION TOOL FOR SURVEY RESPONSES
AND A UNIFYING INTERFACE REDESIGN

by
Iva Cramer

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of the Sally McDonnell Barksdale Honors College.

Oxford
May 2015

Approved by

Advisor: Professor Philip Rhodes

Reader: Professor Dawn Wilkins

Reader: Professor H. C. Cunningham

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DEDICATION

For Lindsey Stirling, Andrew Lloyd Weber, Hans Zimmer, Ellen McLain, Ellie Goulding, Imagine Dragons, Skrillex, Ephixa, deadmau5, Tiesto, Basshunter, Daft Punk, Avicii, The Glitch Mob, Nightmare, Katy Perry, AC/DC, Queen, Def Leppard, Boston, Joan Jett, Journey, A-Ha, Rick Astley, and every other musically inclined entity that kept me going throughout this project and thesis work.

ACKNOWLEDGEMENTS

I would like to thank the following individuals, groups, and institutions for their various contributions to this project:

the Sally McDonnell Barksdale Honors College, the Computer Science department, and FNC, Inc. for providing this opportunity and challenging me to meet higher goals;

my fellow interns Philip Barrasso, Douglas Souza, Elizabeth Walden, and Surma Mukhopadhyay for being excellent teammates on the Fantastic Ninja Crew and working together to birth and grow the echopinion project;

our echopinion coaches Chris Floyd, Robert Mason, Matthew Gray, Jerry Richlovsky, Joey Green, and Kim Byler for smoothing the way by getting tools and giving guidance, and Matthew in particular for continuing as my knowledgeable sponsor;

Jason Verlangieri and Nora Brown for answering my countless questions regarding requirements and providing incredibly helpful answers and access to old tools;

Dr. Dawn Wilkins and Dr. Philip Rhodes for facilitating this project and paper by providing guidance and sources needed to complete it;

my classmates, friends, and family for providing additional, much-needed encouragement and support throughout this process; and

Daniel Garrett, for everything.

Without these, I could not have made it to this point. I am extremely grateful.

ABSTRACT
IVA CRAMER: A Visualization Tool for Survey Responses
and a Unifying Interface Redesign
(Under the direction of Dr. Philip J. Rhodes)

As an intern for financial software company FNC, Inc. during the summer of 2014, my fellow interns and I began an innovation project for creating and analyzing surveys for better client feedback methods. I have continued this project even after the internship, and this thesis covers that continuation: the visualization of survey responses and the redesign of the page on which they are contained. The project detailed here was to revamp the survey statistics page with a coherent layout that matches the rest of the site in addition to overhauling the actual graphs and charts for aesthetic and accuracy.

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List of Abbreviations

CSS: Cascading Style Sheets

D3: Data-Driven Documents; see description in section 2.2

HTML: HyperText Markup Language

KO: Knockout; see description in section 2.1

MVC: Model-View-Controller

SVG: Scalable Vector Graphics

UX: User Experience

UI: User Interface

1 Introduction

1.1 Problem

In this age of information, data has become king. It is for this reason that FNC, Inc., a financial software company based in Oxford, Mississippi, seeks feedback from its clients on the successes and shortcomings of its products in addition to how the clients use said products. Armed with customer replies, FNC can then determine the best ways to increase the quality of their products and services and improve the users' experiences.

As of this writing, FNC completes this process by creating surveys using SurveyMonkey, sending links to the surveys in emails to managers in clients' companies, and then analyzing the response data that rolls in both with SurveyMonkey's charts and by occasional manual inspection for cross-sectional evaluations that are unfeasible with the SurveyMonkey tools provided.

1.1.1 Background for Overall Project: echopinion, FNC Survey Software

As an intern for FNC during the summer of 2014, I was placed on a team with four other interns and six coaches and given the task of completing an innovation project by the end of the internship. We dubbed ourselves the Fantastic Ninja Crew and chose the proposed idea of replacing their surveying tools as our goal. Quickly, we named the project and its website "echopinion" to describe its job—to allow clients to *echo* their *opinions* in the form of survey feedback—and outlined what we would be creating.

Even though the current flow for surveying clients technically works for FNC, there are several areas that can be improved upon with a specialized survey software, and that is where we came into the picture. First, we needed to reach the actual users of FNC's products, not just managers somewhere along the line who may or may not actually use the products. This is much easier to do by having survey prompts pop up inside the products themselves rather than having them linked to in emails to other employees. Another key desired feature was the ability to add images that showed up inline with their respective questions, as opposed to sharing the link to an image hosted elsewhere (which is the current solution when using SurveyMonkey). Finally, any new survey software had to meet or exceed the capabilities of the current one, especially in terms of skip logic and data analysis—the latter of which is, of course, the main point of it all.

1.1.2 Description of Current Subproject: Response Visualization

What I will be primarily discussing here is, in fact, a subproject of echopinion: the visualization of survey responses and the redesign of the page on which they are contained. My goals for this senior project are to revamp the survey statistics page with a coherent layout that matches the rest of the site in addition to providing more detailed data and overhauling the actual graphs and charts. These visualizations are intended to be customizable (by enabling choice of chart type, among others), accurate (by clearly and correctly portraying what the data says, particularly in the case of nonexclusive survey options), and elegant (by following aesthetic conventions and guidelines). The layout of the page, on the other hand, is meant to be responsive (by continuing good use of the Twitter Bootstrap framework), cohesive (by matching the styles and layouts of the rest of

echopinion, including keeping the header and footer intact), minimal (by having the necessary information without cluttering the page), and intuitive (by being clear and easy to understand and use).

1.2 Scope

As noted above in Section 1.1.2, this thesis and senior project only cover the visualization of survey results, not the creation of the surveys themselves or the deployment of echopinion to a production server. By encompassing only the response visualization and its interface, my work is restricted to the survey statistics page of the echopinion website and must fit the style guidelines and other parameters already set out by my team's initial work on said larger project. While some elements of the stylistic theme (for example, alterations to verify compliance with FNC's Ensemble guidelines) or the site's functionality (perhaps the exact method for choosing the survey's target recipients, among other things) may need to change before deployment, they are not included in this senior project and would be completed at a later date. What I do cover here is not only rearranging a layout and switching graphing tools, but also taking a journey into the lands of user experience and information visualization and learning how to display data well. In order to be transparent and understood on what is being shown, I researched data visualization methods, and particularly for survey responses.

1.3 Importance of Feedback

Gathering and analyzing feedback from clients, as stated above in Section 1.1, can help positively direct the relationships and product alterations of a company. According to

an article in *Policy & Practice* by Adrian Bordone, the relationship-building aspect is a key part of acquiring meaningful feedback:

Reaching out to constituents for feedback provides an additional opportunity, outside of programs or regular caseworker meetings, to have a meaningful interaction with constituents and build the relationship and constituents' regard for your organization. (Bordone 18)

Additionally, this feedback should be regular and intelligently evaluated, making for consistent data over the long run and wiser decisions in making updates to software provided. Bordone continues, emphasizing the delicate balance:

Constituent feedback must be an intentional and acknowledged part of an organization's routine, a regular and necessary source of information at every stage of service provision... However, organizations have to balance what constituents express as their wants and needs with other program requirements, best practices, and evidence. (Bordone 38)

As nice as it would be to cater to every user, reality dictates that companies must find the equilibrium of satisfying as many customers as possible while keeping company identity, not overworking employees, following conventions and best practices, keeping to the project's requirements, and acting on evidence of what works best. By improving the survey (creation and) analysis process for FNC, I am assisting with this ongoing process.

1.4 Preparatory Work

To bring this project to life, I started with the basics for the two sections. For the layout, I went through several iterations of brainstorming and sketching out wireframes

before borrowing and reworking relevant pieces of code from echopinion's home page to lay the groundwork for the containers. For the visualizations, I began simply by exploring the D3 (Data-Driven Documents) gallery online, downloading the library, and completing some tutorials to acclimate myself with how it works. I also performed plenty of preliminary research on proper chart usage, information visualization standards, and user experience practices in order to make informed decisions when executing my redesigns.

1.5 Contrast to Previous Solution

Even though the page layout and the use of Google Charts technically work for the survey statistics page, they were quick-and-dirty solutions that were hurriedly chosen and implemented within the last few days of the internship. Consequently, they were not as thorough, complete, or well-matched to the rest of the echopinion website as they could have been if my outstanding team had had the time needed to do it better. With this in mind, I decided to take this page and its visualizations on as my senior project, intending to rearrange, unify, and polish the display of survey statistics.

This still does not explain my choice in using D3.js instead of simply modifying the existing Google Charts solution, so I will now explain my two main reasons for that choice. First is the lesser motive: after discovering D3 and its many uses a few years ago and wanting to use it for a project, I realized that this would be a perfect opportunity to do so. Second, and more importantly, D3 provides more flexibility than Google Charts in what and how it can visualize, and while this may not be critical at the moment, it will come in handy in future uses—particularly for visualizing parsed string responses or for displaying cross-sectional survey data.

2 Tools

2.1 Knockout

The Knockout JavaScript library, also referred to as KO, is helpful when implementing dynamically updating interfaces. Knockout's official website explains that this framework assists the user in "[creating] rich, responsive display and editor user interfaces with a clean underlying data model" ("Getting Started"). Its declarative data bindings make easier work of connecting various data points into a display that automatically responds to user actions or external changes. Knockout had already been made part of the echopinion project before I took on this senior project, so in this case, I am simply continuing its usage by linking the display with the data via Knockout bindings.

2.2 Data-Driven Documents

Made by Mike Bostock, the Data-Driven Documents JavaScript library says it all in the name: it allows developers to create and manipulate web documents based on the data given, essentially driving the documents with the data. Most commonly shortened to just D3, this library is excellent for data visualization with its usage of HTML, CSS, and particularly SVG. On its homepage, Data-Driven Documents is explained as follows:

D3 allows you to bind arbitrary data to a Document Object Model (DOM), and then apply data-driven transformations to the document... D3 is not a monolithic framework that seeks to provide every conceivable feature.

Instead, D3 solves the crux of the problem: efficient manipulation of documents based on data. This avoids proprietary representation and affords extraordinary flexibility, exposing the full capabilities of web standards such as HTML, SVG, and CSS. With minimal overhead, D3 is extremely fast, supporting large datasets and dynamic behaviors for interaction and animation. D3's functional style allows code reuse through a diverse collection of components and plugins. (Bostock)

The official D3 website and its Github repository also include hundreds of elegant, high-quality examples created using this powerful library, with instances ranging from color theory games to force-directed maps to bubbles showing keywords at political events. D3 has proven its usefulness for creating superior, web standard-adherent visualizations, and that is largely why I chose it as my main tool for creating the charts.

2.3 Ensemble/Bootstrap

2.3.1 Twitter Bootstrap

Created by developers Mark Otto and Jacob Thornton, Twitter's Bootstrap is a front-end web development framework that provides "carefully crafted yet easily modified styles and scripts for the essential elements of a complete web interface" (Cochran). Comparing it to jQuery, *Twitter Bootstrap Web Development How-To* author David Cochran goes on to describe Bootstrap as follows:

...Twitter Bootstrap represents an informed and energetic community exerting its best efforts toward a common and shareable set of best practices. Without demanding submission or commanding uniformity, the community

exerts authority for a simple reason: it produces a cohesive collection of tested, tried, and proven lines of code. The code base may be adopted and embraced, customized and modified, or dissected and examined. In all cases it offers serious solutions for real problems—solutions that speed developers on their way to serving up consistent, reliable, and user-friendly web experiences. (Cochran)

The beauty of Bootstrap is its elegant combination of uniformity and customizability. By providing classy web elements and streamlined standards for putting them together on pages, Twitter’s developers have facilitated accelerated higher quality web development.

2.3.2 FNC Ensemble

As noted above in section 2.3.1, Bootstrap was made for adaptability. FNC took advantage of this characteristic and developed Ensemble, the FNC-tuned version of Bootstrap. Described on its own home how-to page, “Ensemble plays with Bootstrap 3; it overrides colors and styles and conforms it to FNC's style standards” (“Ensemble”). Unfortunately, the echopinion project got started a bit too soon to use the newest version of Ensemble (version 3, which was released and demonstrated in the midst of this senior project), and achieving full Ensemble3 compliance for all of echopinion is outside of this senior project’s scope, so I instead chose to continue matching the survey statistics page with the older, Ensemble2-esque version seen in the rest of the echopinion website.

3 Design Choices

3.1 User Interface

3.1.1 Layout and Organization

Good design dictates cohesiveness, both in form and function. UX expert Jesse James Garrett explains that “[a] successful design is not merely a collection of small, well-designed objects; rather, the objects should form a system that operates as a cohesive, consistent whole...” He goes on to say that designers must “set out to provide [the users] with an experience that is cohesive, intuitive, and maybe even pleasurable” (Garrett). To achieve continuity and thematic similarity, the original, quick design of the survey statistics page had to be replaced with something more suited to the styles and functions of the rest of the echopinion site. Additionally, certain elements needed usability improvements; for example, the list of questions to choose from for charting did indeed show the question text at the top, but did not otherwise indicate in the list itself which question was selected.

Given the desired nature of the survey statistics page, I determined it was best to follow an overall layout form similar to SurveyMonkey’s analysis area but with the aesthetic and behavior of echopinion’s survey creation homepage. However, instead of tabs on a top row, there are options in the left sidebar because their function—updating the right field based on options chosen—similar to how the homepage is set up for survey creation.

3.1.2 Toggles and Details

Because there are several visualization types (bar graph, pie chart, and table) and two ways to describe the data (total tallies and as percentages), I knew I would need to deal with toggling different views and content. Both of the toggles are dropdown boxes, since dropdowns are better for having more elegance and taking up less space than radio buttons. Another solution I discovered along the way was Bootstrap button groups, but I decided not to include them in this project since the rest of echopinion already solely used dropdowns when providing exclusive-choice pickers similar to these toggles. This is also where Knockout and MVC come in handy: I bind the toggles, of either type, to variables that determine what content is showing. In contrast, I decided (quickly and easily) to include both tallies and percentages for the relevant fields in the sidebar overview area since doing so for this part of the data did not warrant the use of buttons for switching between the two.

3.1.3 Color Scheme

Choosing the colors for the theme was one of the easiest choices of the whole project, since (as aforementioned) continuity is key to good design—and there were already standards in place. Foundations for echopinion were already laid with “FNC navy” as the primary color, so I continued its use as the primary hue for the statistics page as well. I also took advantage of the fact that, on the Ensemble website, the rest of FNC’s color palette is clearly enumerated—hex color values and Ensemble class names included. These blues and grays are the ones used in my new charts, with an automatic return to the beginning of the list if enough bars or pie slices exist to demand more.

3.2 Chart Choices

3.2.1 Pie Charts

Popular among the public but undesired by many experts, pie charts have a specific use unrecognized by most people who encounter them: “...to show part-whole relationships” (Kosara). In his article “Understanding Pie Charts”, visualization research scientist Robert Kosara goes on to describe four basic criteria to meet for choosing to use a pie chart: the parts combine to form a “meaningful whole”, the parts are mutually exclusive, the goal is to compare the parts to the whole instead of to each other, and there are fewer than five to seven parts to be shown. Since there are indeed plenty of instances in FNC’s surveying process that meet these criteria, pie charts made the cut.

However, my other round chart choice did not pass the research stage. Evidently, there is only so much room for dessert references when it comes to easily digestible charts. According to several sources, including the aforementioned article, the center of the pie is the most important because people use the angles meeting there to more accurately determine the sizes of slices. Obstructing or removing the middle, as in a doughnut chart and others like it, “obscures the spot where the lines meet, and thus makes it impossible to judge angles, making the comparison more difficult” (Kosara). In other words, pies, not doughnuts, are the sweeter way to go when it comes to visualizing data in a rounder manner. Consequently, I retracted my initial plan to use doughnut charts and instead solidly chose pie charts as the lone part-to-whole comparison chart I would provide.

3.2.2 Bar Charts

Kosara also explained that “the pie chart is the wrong chart type to use as a default; the bar chart is a much better choice for that.” Many see bar graphs as the safe choice, and for good reason: they are straightforward, and they work well with various types of data. Additionally, bar charts are loved by professionals and amateurs—there is no large squabble over their efficacy in clearly portraying many kinds of data—so they were an easy, obvious choice for me to make.

3.2.3 Simple Lists and Tables

Finally, in some cases, less is more. Basic lists or tables display the information in the most straightforward, no-frills manner available, and sometimes, that is exactly what is desired. For FNC, this is the case: there are times when the raw numbers are needed more than any colorful graphs. Following the style found on echopinion’s page for viewing the list of all surveys, and also following the idea that striped tables are easier to read, I chose the design of a simple striped, sortable table for string display and as an alternative to the charts if desired. Striping and sorting are abilities facilitated by Bootstrap itself, and being able to sort the data is a step above what is already in place for the view surveys page elsewhere in echopinion.

3.3 Handling Different Answer Types

Clearly, not all answers are created equal. As convenient as it was to dump (almost) all the data into pie charts for the original quick solution, this is neither optimal nor preferred when it comes to visualizing results clearly and accurately. Only some types of

answers can be dropped into pie charts without hesitation, and even then, the application must be of the right variety (as described above in Section 3.2.1). Therefore, I researched and chose the three best ways to handle the data in this particular situation.

3.3.1 Radio Buttons and Dropdowns (Exclusive Options)

Probably the broadest answer type range, including everything from basic dichotomous “yes/no” questions to Likert and Stapel scales, these exclusive answer choices are also the easiest to visualize. By only allowing one selection per respondent, these responses can be shown in any number of ways, including both the pie and bar graph types I described above.

3.3.2 Checkboxes (Non-exclusive Options)

Non-exclusive answer choices, seen most often as checkboxes, fall in the middle in terms of difficulty in visualization and analysis: they still have only a finite number of predetermined answers, but the selections-per-respondent ratio is no longer one-to-one. In Chapter 13 of the *Data + Design* collaborative ebook on data design and information visualization, Ellen Cooper dives into the nature of checkbox responses and how to visualize them in straightforward ways:

Checkbox questions...[are] actually just a shorthand way to write a series of yes/no questions. A respondent checks a box if an answer choice applies and leaves it blank if it doesn't. ...With the checkbox question, survey respondents only need to check the answers that apply to them, while in a series of yes/no questions, they would need to respond to every question,

even if all their answers were “No”. With a checkbox question, you can simply provide a “None” option at the bottom of your choice list to handle this situation. When several yes/no questions are related, checkbox questions also prevent repetition of instructions, since all the questions are grouped into one. (Cooper)

Then, perhaps, one could take advantage of the root of the matter and visualize checkbox results as a set of charts—one for each option, showing how many respondents selected each one. While that could work, it is a much less summarized way to view the data, and comparing information across multiple pie charts (a likely choice in this case) is not as easy or reliable as having the data aggregated into one clear chart.

Cooper proposes two better solutions for displaying summary data for checkbox responses. “One way is to construct a bar graph and base the percentages on the number of respondents that selected each answer choice,” she explains, with an example bar graph following the comment. “However,” Cooper points out, “the fact that the total adds to more than 100% can be unsettling for some...” Additionally, this method rules out the possibility of using a pie chart as the visualization, since pie charts require their parts to sum to exactly 100%, no more and no less. So for those who wish to have percentages that add up together, she gives an alternative method: “[basing] the percentages on the total mentions” of a particular choice instead of total number of respondents who chose that option. Following her second description is another bar graph whose bar lengths are exactly the same as those in the first (since the data and the essential comparison are the same) but whose percentages differ from the first because of the categories being used to calculate them. These two bar graph options are the ones I chose for this project.

3.3.3 Short and Long Answer (Open-Ended Responses)

By far the trickiest answers to visualize in any complex manner, text responses require significantly more attention if anything other than a simple listing is used to display them. More complex text visualization runs the gamut from word bubbles to grammar trees, with features ranging from basic sorting and searching all the way to in-depth, emotional tone analysis. However, since FNC only very rarely has any surveys that include any serious long answer questions and only needs a simple way to view the short answer responses, my choice of a basic sortable table is fitted to the company's needs.

4 Implementation

4.1 Before

In Figures 1-8, the header of each webpage has been excluded from the figures since it is large and is the same for all except for which of three navigation buttons appear(s) in the top right corner. Note the minimal data provided in these “before” figures: the reader can see the survey title, question numbers, question texts, input types, and either simple lists or pie charts with varying degrees of efficacy.

4.1.1 Interface

Instead of following the form of either of the other two pages in the echopinion website, this survey statistics page in its previous form had its own design. When the user first lands on this page, the survey title and the list of questions appear, as seen in Figure 1. The question table includes the question number, question text, and answer input type as columns to help distinguish questions from one another. Next, when the user selects a question to view, the table shifts down to make way for the data display area. An example of this is shown in Figure 2, in which a short text box question was chosen and its corresponding responses displayed in a scrolling, striped table. This shifting feels clumsy at best, and the lack of a highlight or other indicator inside the table for which question’s statistics are being viewed can feel disorienting.

Survey data for: TESTING STATS!		
Question Number	Question	Input Type
1	What's your name?	Short Text Box
2	How are you today?	Radio Buttons
3	Excited for the last week?	Dropdown
4	Favorite colors?	Checkboxes
5	Favorite month?	Checkboxes
Created July 2014 by the Fantastic Ninja Crew		

Figure 1. Former survey statistics landing page

Survey data for: TESTING STATS!		
Results for: What's your name?		
<div> <div>River Song</div> <div>Black Widow</div> <div>doug</div> <div>Marty McFly</div> <div>Paul the Apostle</div> <div>Abraham Lincoln</div> <div>the dude</div> </div>		
Question Number	Question	Input Type
1	What's your name?	Short Text Box
2	How are you today?	Radio Buttons
3	Excited for the last week?	Dropdown
4	Favorite colors?	Checkboxes

Figure 2. Former string answer display

Finally, in Figure 3, the survey creation home page shows an alternative layout that could have been used in the design of this survey statistics page. This design has a left sidebar—made for building one question at a time and its answer type—that will update the right-hand survey area once the question is created or done being edited. I chose a very similar design in my remake for continuity and to help make the flow of the page more apparent and intuitive.

The image shows a web interface for creating surveys, divided into two main sections: a left sidebar and a main right-hand area.

Left Sidebar (Question Builder):

- Question Builder** (Section Header)
- Question text:** A text input field.
- Options:** Three checkboxes: "Add help text", "Required question", and "Add an image".
- Answer type:** A dropdown menu currently showing "Short Text Box".
- Buttons:** "Save question" (dark blue) and "Clear question builder" (light grey).

Main Right-Hand Area (Form Builder):

- Form Builder** (Section Header)
- Client:** A dropdown menu showing "Capital One - 11111".
- Dates:** Two input fields labeled "From" and "to".
- Survey title:** A text input field with placeholder text: "Ex: CMSnet UCDP feature dd/mm/yy (Required)".
- Survey description:** A text area with placeholder text: "Ex: This is a 5-minute survey about the new UCDP feature. You can find this in the workspace, as shown in the image below. If you have not yet".
- Add an image:** A button labeled "Choose File" and the text "No file chosen".

Figure 3. Survey creation homepage, for layout reference

4.1.2 List and Charts

As previously stated, the original data displays were limited to a table for strings responses and Google pie charts for all other input types. Figure 4 shows a pie chart example for a radio button question with respondent percentages centered in the pie slices and a coloration legend centered on the right hand side.

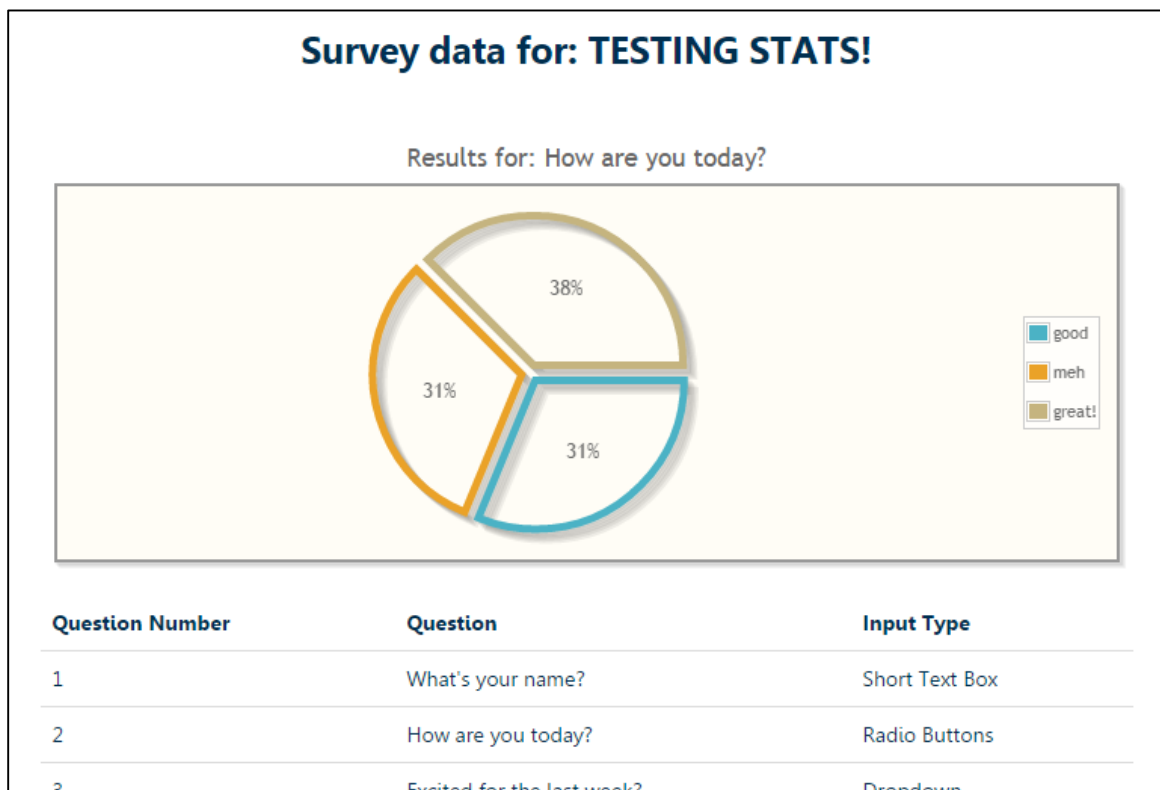


Figure 4. Former radio button answer display

This choice in pie charts works well enough for questions requiring inputs from exclusive answer types, such as radio buttons and dropdowns, but nonexclusive (checkbox) questions do not fare so well with this chart type in terms of accurately and comprehensibly communicating what the data says. For example, in Figure 5, it is unclear whether the

percentages are still in regards to the total number of respondents or instead in regards to the total number of times checkboxes were checked. Figure 5 also shows how the display area does not contain the legend well when it has more than nine or so items in it.

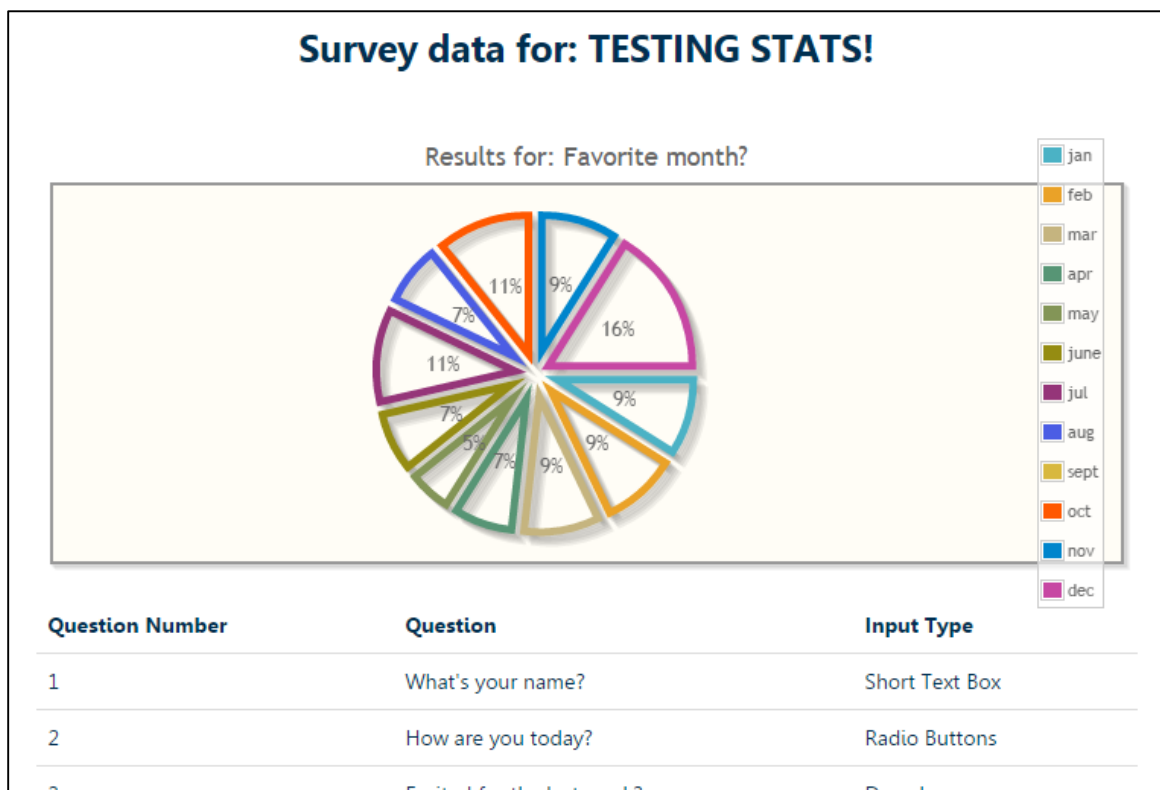


Figure 5. Former checkbox answer display

4.2 After

Taking all the research, existing page designs, and past experience into consideration, I carefully sketched and re-sketched the wireframe for this survey statistics page and its dynamic elements, hashing out the big picture and the details. I continued use of Bootstrap and color schemes set up by FNC, and the flow mimicked that of the survey creation page with several elements triggering what content loads elsewhere.

4.2.1 Interface

The new survey statistics page is based on echopinion's survey-making homepage for consistency, but with right-hand column and chart field inspired and influenced by SurveyMonkey for user familiarity. The left sidebar contains two sections: a Survey overview for identifying information and overall statistics, and a Question section for picking a specific question and seeing its charts and overall statistics. The Survey section is a static display of the chosen survey's basic information, whereas the Question section allows for interaction: choosing a question prompts chart display in the right side. For each question in the Question section, I kept the question number, question text, and answer input type fields from the original display. However, I also added tallies and percentages for numbers of respondents as two display options for the chart space. The right area is where the chart, table, or listing is shown for a selected question. Which visualization is displayed there depends on the chart type selected with the top chart toggle, and how the data is formatted depends on the settings chosen in the top tally/percent toggle. Figures 6 through 9 show the layout and how questions can be chosen from the left sidebar.

4.2.2 Visualizations

D3 came through with its promises of stunning visualization capabilities: after learning the ropes and trying some tutorials, I was able to put together responsive pie and bar charts using the FNC color scheme. The right-hand chart display area includes toggles for choosing which type of visualization to use (with pie charts inaccessible for all but exclusive answer types, and bar graphs unavailable for string inputs) and whether that visualization shows total tallies or percentages. The tally/percentage button group toggle

is disabled when viewing a table or an individual respondent's data. Figures 6, 7, and 8 show the new pie chart, bar graph, and table view, respectively.

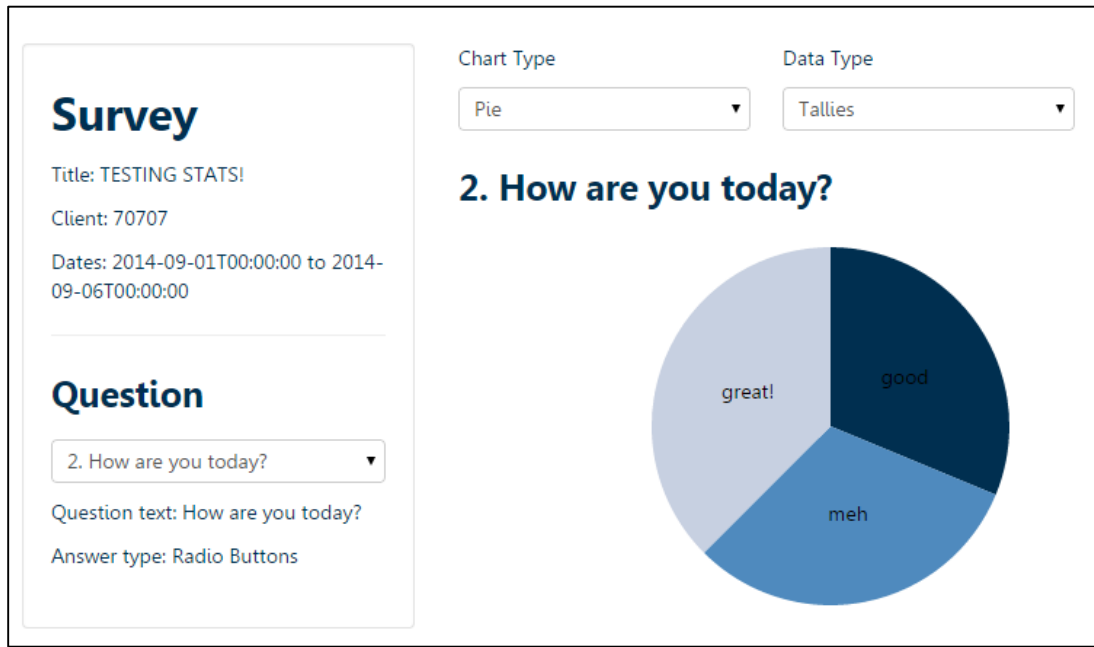


Figure 6. New pie chart display

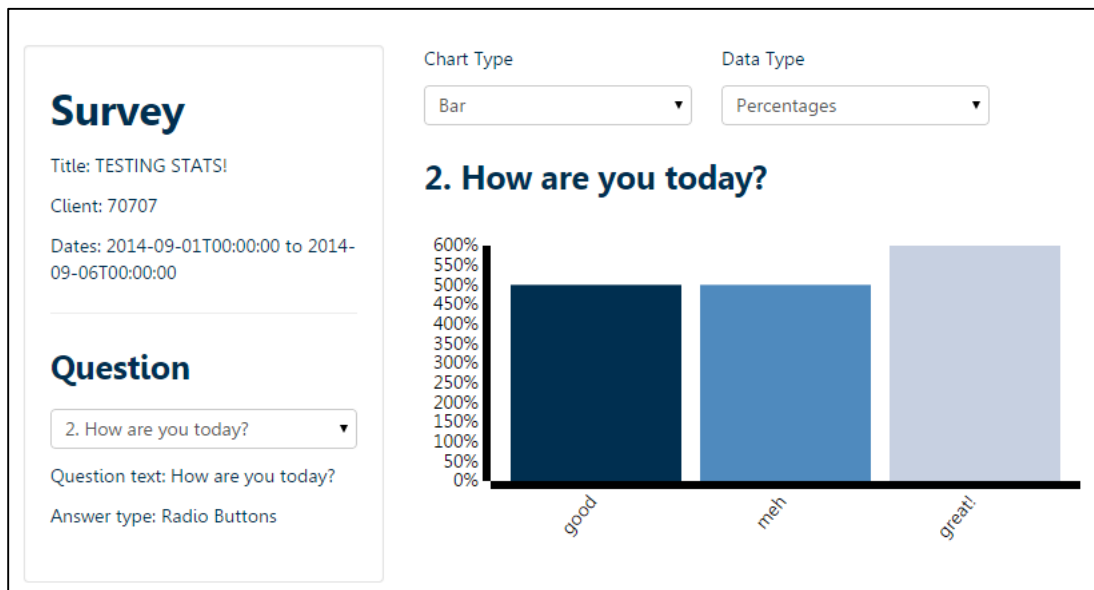


Figure 7. New bar graph display

Survey

Title: TESTING STATS!

Client: 70707

Dates: 2014-09-01T00:00:00 to 2014-09-06T00:00:00

Question

2. How are you today?

Question text: How are you today?

Answer type: Radio Buttons

Chart Type

List

Data Type

Tallies

2. How are you today?

Answer	Times Chosen
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Figure 8. New table display

5 Conclusion

5.1 Reflection

Little did I know four years ago when I discovered `koalastothemax.com` that I would be using the powerful library behind it—`D3.js`—for my senior project and thesis. There are still plenty of features and functionality in its volumes that I have left undiscovered and unused for now, but I was glad to just dive into D3 and see the survey data brought to life in brighter and better ways. This also turned out to be an excellent project for meeting my interests in the middle: the crash-course in JavaScript bolstered my front-end development skills, the requirement for lovely visualizations satiated my artistic side, and the need for good usability and flow led me into some fascinating UX research. By no means is this the end of echopinion or of my research; rather, it is a milestone and a magnificent jumping-off point.

5.2 Potential Future Modifications and Additions

5.2.1 Text Analysis

One feature I had particularly been looking forward to adding was the in-depth analysis of the open-ended responses; however, after receiving more requirements and hearing the preferences and needs of the marketing team, text analysis got pushed to the back burner. Despite it being a large undertaking, I had hoped to be able to learn more about natural language processing and brainstorm or find creative ways to visualize string

responses. My favorite solutions thus far included determining emotional themes and tones (particularly since these would mainly be responses regarding attitudes about certain products and services—typically more emotionally charged texts by nature of being prompted by a company needing opinions) and visualizing said themes in organized clusters or word bubbles. Making the text replies sortable and searchable was a smaller goal that also got pushed back with the rest of this text analysis due to its being unnecessary at the time. While some sort of text analysis feature would be appreciated in the future, the marketing team informed me that this is much less of a priority at the moment, given that only a few surveys every year or two rely mainly on gathering long replies to open-ended survey questions.

5.2.2 Cross-sectional data analysis

Analyzing summaries of surveys, their specific questions, and the individual responders will give excellent first- and second-layer information about surveys and their targets, but providing cross-sectional data peels back another crucial layer. However, the FNC marketing team can only do this currently by printing out mountains of pages with all the survey data and manually cross-referencing the critical data points—a tedious, error-prone process. Unfortunately, this, too, was bumped out of the queue for this senior project and placed into the bucket of “things to do” for later echopinion efforts.

5.2.3 Complete Ensemble3 Compliance

Although this is less urgent due to being already partially implemented, stylistic, and regarding a non-public-facing part of FNC, having the survey statistics page and all of

echopinion follow the guidelines set out by the Ensemble3 instructions is something I would like to see happen before echopinion gets deployed for actual use. Keeping to the code will freshen the look and upgrade it to keep up with FNC's latest stylings in addition to guarding the internal unity through uniformity of the website.

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